



EPA Region 7 TMDL Review

TMDL ID	308	Water Body ID	21-part, 22, 24, 1, 3, 4, 6, 8, 10
Water Body Name	Smoky Hill River		
Pollutant	Fluoride		
Tributary	Tributary segments attached to decision document		
State	KS	HUC	10260001, 10260002, 10260003, 10260004
Basin	Smoky Hill/Saline River		
Submittal Date	07/09/2004		
Approved	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

A letter was received by EPA on July 9, 2004, formally submitting this TMDL document for approval under Section 303(d). A revised document was received by EPA on July 29, 2004.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Impaired use is for irrigation, domestic water supply and stock water with numeric WQS of 1 mg/L for irrigation; 2 mg/L for domestic water supply and stock water (KAR 28-16-28e(c)(1)&3(A)). The natural sources of fluoride elevate concentrations above the standard, and this TMDL is phased. A specific stream criterion to account for naturally occurring fluoride will be developed in Phase One following the appropriate administrative and technical Water Quality Standards process.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The desired endpoint is to achieve WQS for the waterbodies assigned uses. Even though the current WQS of 1 mg/L of fluoride was used in this phased TMDL, the watershed is affected by fluoride rich ground water from the discharge of the Ogallala-High Plains aquifer. Because of this, the upper Smoky Hill River has elevated fluoride levels throughout periods where flow is present and dominated by this natural source. The natural background of the fluoride is consistently above the WQS criterion of 1 mg/L for irrigation and occasionally over the stock water WQS of 2 mg/L for domestic water supply and stock water. Kansas implementation procedure allows for a numerical criterion based on natural background to be set from samples taken at flows less than median in-stream flow; this will be implemented in phase 2 of this TMDL which will ensure water quality standards attainment.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The ultimate target is the numeric WQS criterion and the link between the target and the fluoride is direct.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

The main contributor of fluoride to the Smoky Hill River stream system is ground water discharge from the Ogallala-High Plains aquifer. The higher fluoride concentration in the aquifer is associated with silica content and dissolution of volcanic ash deposits. There are no permitted NPDES facilities discharging into the system. Irrigation using groundwater, however, is extensive in the watershed, and has lowered the water table, diminishing flows in the streams. County totals range from 7,212 acre-feet for Logan County to 70,931 acre-feet for Wallace County in 2001. There is no surface water irrigation and because of the high evapotranspiration rates, there is no return flow for irrigation.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The allocation is expressed as a TMDL load duration curve in pounds per day of fluoride which is derived from the numeric criteria of 1 mg/L and 2 mg/L on the flow curve. The allocation is a function of the flow and adjusts to the ambient background concentrations seen as a result of flow conditions.

WLA Comment

The wasteload allocation is zero.

LA Comment

At flows exceeded more than 50% of the time, the load allocation established at the criterion of 1 mg/L ranges from 0.05 to 1.84 pounds per day fluoride. At the 1.25 mg/L criterion, the load allocation ranges from 0.07 to 2.3 pounds per day fluoride. And at the 2 mg/L criterion, where flow is greater than the median flow, the load allocation ranges from 4 to 518 pounds per day fluoride.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The margin of safety is implicit based on the lack of anthropogenic sources contributing to fluoride to the streams at lower flows and the lack of use made of surface water for irrigation.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

There is documentation of the seasonal pattern of elevated fluoride levels in relation to seasonal streamflow rates.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public meetings were held, and the Basin Advisory Committee met, in Hays, Kansas to discuss the Smoky Hill/Saline River Basin TMDLs on January 7, 2003 and March 5, 2003. A public internet web site was also established at <http://www.kdhe.state.ks.us/tmdl/>. A public hearing was held in Hays on June 2, 2003.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

This TMDL is phased and KDHE will continue to collect samples at stations 224 and 724 on the Smoky Hill River near Elkader and on Willow Creek.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

Reasonable assurance is not required for this TMDL, but includes numerous authorities and funding through the Kansas Water Plan.
